

REMARKS

The specification has been amended to correct an error in the designation of the monoamine specified in Samples 12A and 12B and to make a consequential correction to paragraph 40. The error is apparent when comparing the ratios of starting materials by weight and by equivalents. (Note that Samples 10A and 10B have the same weight ratios as Samples 12A and 12B but are stated to have different equivalents ratios. As reported in Table 1, the molecular weight, and hence the equivalent weight, of monoamine 1 is twice that of monoamine 2 so that the same weight of monoamine 2 as that of monoamine 1 will supply twice as many equivalents of monoamine 2 as it would of monoamine 1. This is what is shown in Table 3 when comparing samples 10 and 12. Therefore, this amendment adds no new matter.

Claims 1 - 23 and 52 - 56 have been canceled without prejudice.

In response to the examiner's rejections under 35 USC 112 second paragraph, claims 9 - 11 have been canceled so that the rejection of these claims is now moot. Submitted herewith are pages describing Jeffamine's obtained from the web-site of their manufacturer (Hunstman) on September 15, 2006. These pages give the molecular weights of common polyether monoamines and polyether diamines as understood by those skilled in the art. The compounds are all of relatively low molecular weight so that differences in the determination of molecular weights by different methods (which is the underlying reason why molecular weights are sometimes determined by number average and sometimes by weight average) are small. The fact that it is conventional simply to refer to "molecular weight without specifying this more precisely for polyether amines is confirmed by the prior art cited by the examiner. Thus Thorne at column 4 lines 22 to 24 simply refers to the molecular weight of polyether amines and Rosthauser does the same at column 8 line 57. It is therefore submitted that the means for identification of the poly ether amines in claims 32 -34 is in accordance with the norms of this art and should be accepted. Similar comments apply to the polyether diols, as is shown by the attached literature describing Pluracols and Puronics obtained from the BASF web-site on September 16, 2006 and the references at Column 4 lines 14 to 16 of Thorne et al..

So far as the use of trademarks is concerned, claims 15 and 16 have been canceled. So far as claims 38 and 39 are concerned, it is pointed out that the art frequently refers to particular compounds by their Jeffamine names. This is shown by the references to the use of these names in the cited art as noted above. Additionally, it is pointed out that the MPEP 608.1(v) specifically states that as long as certain conditions are met, it is perfectly proper to use trade marks in claims. Such conditions are met in the present case. As noted above, literature on the well known, commercially available Jeffamine products is enclosed with this response. Similarly this trademark is also used in the prior art references relied on by the examiner.

It is therefore submitted that the requirements of 35 USC 112 second paragraph have been complied with.

Turning now to the rejection under 35 USC 102(b) over Thornes et al. or over Rosthauser et al., the rejections of claims 1 - 3, 7 - 23 and 52- 56 are moot in view of the cancellation of these claims. This leaves the rejection of claims 24 - 25, 30 - 48 and 57 - 66 over Thornes and of 24 -34, 38 - 42, 45 - 46 and 49 - 51 over Rosthauser.

Before discussing the particular prior art references, the applicants draw attention to a particular feature of claims 24 and 51 which is not commented on in the official action, namely that the composition is defined in product by process terms requiring heating so as to increase the number of isocyanate functional groups contained in the composition.

The applicants also wish to draw attention to US Patents 6384175 (Danielmeier) and 6426414 (Laas) which were filed on February 15, 2001 and May 14, 1999 respectively and give a better indication of the state of the art close to the date of filing the present application (December 1, 2003) than does the art cited by the examiner both of which were filed in 1992. An IDS listing these references is being submitted herewith.

The present invention relates to water dispersible polyisocyanates (WDPI) into which urea etc. groups have been introduced. Because urea groups are known to form both mono-dentate and bi-dentate structures with inter molecular hydrogen bonding, compounds

containing such groups tend to be solids or viscous liquids that are not easily dispersed in water. These factors have militated against their use in producing WDPIs. US Patent 6,384,175 describes certain particular WDPIs having N-acylurea/amide groups that can "be stirred considerably more easily and in a more finely divided form into an aqueous system than water-dispersible polyisocyanates of the prior art" (column 3 lines 12 - 14). It is stated that this is based on the "surprising observation that the reaction of polyisocyanate molecules consisting of at least two isocyanate molecules with polyoxyalkylene ethers containing acid groups results in ... "WDPIs that can be dispersed with significantly lower degrees of hydrophilic modification than prior materials. US Patent 6,426,414 adopts a different approach to reducing the problems resulting from hydrogen bonding by allophanizing a high proportion of urethane linkages formed by an isocyanate-hydroxy reaction in forming the product by reaction of a polyisocyanate and a monofunctional polyalkylene oxide polyether alcohol.

As shown by the art cited by the examiner and the two references noted in the preceding paragraph, there is a need for WDPIs/ The present invention addresses this need by providing a new type of WDPI in which hydrophilic polyetheramine chains are connected to polyisocyanates to form urea units initially. The urea products are heated to result in at least some formation of biuret and polyuret. The effect of this heating is shown in the attached Appendix -1. This conversion to biuret and polyurets led to a surprisingly lower viscosity and higher isocyanate functionality than unheated product as a result of a decrease in bi-dentate urea interactions. As noted above, this heating requirement is clearly set out in claims 24 and 51 and was not commented upon by the examiner in the official action.

Turning now to the cited art, Thornes does not disclose the inventive features of the present independent claims. Thornes teaches dissolving a monomer mixture of a polyisocyanate and a hydrophilic polyether in a water-miscible organic solvent and then effecting polymerization by heating in the presence of an initiator. This product is then mixed with a polyisocyanate having tertiary isocyanate groups. Although this technique involves a heating step, this differs from the heating of the present invention in that it is carried out in order to effect polymerization, which increases viscosity and not to produce biuret or polyuret as required in the present invention and has the effect of reducing

viscosity. The products of the present invention are therefore different from those of Thornes.

Turning now to Rosthauser, this discloses an aqueous polyurea dispersion. Although this has some similarities to component (b) of the present claims, it differs in that it comprises a polyamine component as opposed to the polyether amine or mixed polyether amine/polyether alcohol required in the present claims. Rosthauser does not disclose the inventive characteristics of the present invention, namely a urea product that is obtained by reacting an aliphatic polyisocyanate with a polyether amine alone or together with a polyether alcohol at ambient temperature and then subjecting the product to a heat treatment in the presence of an excess of polyisocyanate to convert the product into one containing urea derivatives such as biuret and polyuret. Rosthauser teaches only a product similar to component (b) of the claimed invention. It does not disclose a water dispersible composition comprising the urea derivatives specified in the claims of the present application.

The invention as claimed therefore complies with the requirements of 35 USC 102(b) in the light of the cited art.

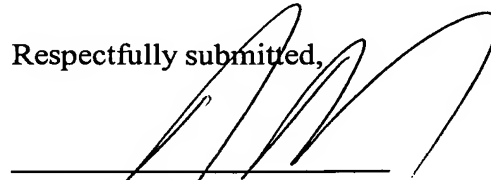
So far as 35 USC 103(a) is concerned, the examiner has cited nothing that would give one skilled in the art a motivation to modify the prior compositions to produce a product. As shown in the present examples, the production of the urea derivative groups such as biuret and polyuret permits an increase of the molecular weights and functionalities of the isocyanate while avoiding any increase in viscosity and indeed in some cases reducing it. Attached as Appendix - II, is a C13 NMR Study showing the increasing concentrations of biuret in products as the urea content drops thereby showing the importance of the heating to effect the production of the urea derivatives whose presence aids water dispersion.

Nothing in the prior art points towards the desirability of such derivatization of urea groups to improve water dispersibility.

It is therefore submitted that the invention as claimed complies with the requirements of 35 USC 103.

In view of the foregoing, it is submitted that this application is now in order for allowance and an early action to this end is respectfully solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'John Richards', written over a horizontal line.

John Richards

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